PART FIVE
NUCLEAR, BIOLOGICAL, AND CHEMICAL OPERATIONS

CHAPTER 13
PROTECTION FROM CONTAMINATION

PERSONNEL PROTECTION

Generally, food is not prepared or served in an environment contaminated by NBC agents. It is important to continue operations only after ensuring adequate individual protection. Field kitchens must be moved to uncontaminated areas and decontaminated before food service can be resumed. It is important to remember that striking and loading the field kitchen is more difficult and takes longer when soldiers are wearing chemical protective clothing. The tactical situation and the priorities for decontamination will determine how long MREs are used.

In exceptional situations, it may be necessary to serve food in a contaminated environment. The decision to feed in a contaminated environment rests with the commander. Provisions must be made to partially decontaminate personnel and ensure that food does not contact contaminated terrain or material. The method of feeding troops in such an environment depends on the type and extent of contamination and on the availability of protective shelters. Troops in an area contaminated by chemical agents with no detectable vapor hazard or in an area where they are under the constant threat of NBC attack must be fed on a rotating basis. Feed about 25 percent of the troops at a time. The other 75 percent should remain masked. Take care at all times to avoid contaminating food.

If the troops are in a contaminated area where there is also a vapor hazard, feed them inside a shelter equipped with an overpressure system. The overpressure system fills the shelter with pressurized air that has been filtered to remove NBC contamination. The M20 simplified collective protection equipment includes a built-in overpressure system. Since this shelter has a limited capacity, the commander and the FOS must plan to feed the troops in shifts. Entering and exiting this shelter is a complicated procedure. FM 3-4 describes how it is done. STP 21-1-SMCT contains more information on how to survive and conduct operations in a contaminated environment.

FOOD PROTECTION

Food must be protected from NBC contamination. Procedures for subsistence protection must be a part of operational plans and SOPs at all levels of food service and Class I operations. Consuming contaminated food may cause illness, injury, or death. Food stored outdoors should be under overhead cover as mustard or VX agents will damage or degrade most protective wraps. Some food items may be decontaminated and consumed. However, decontamination is often a difficult and time-consuming process. Subsistence must be stored in ways to provide maximum protection in the presence of NBC contaminants. Planning for storage may mean the difference between having edible or non-edible subsistence. Foods that are packed in cans, bottles, airtight foil, or film wraps, as well as food packaged in sealed boxes or multilayered wrappings may be stored outdoors or

in partially protected areas. Foods not packaged in this manner must have covered storage inside if possible to protect it from NBC contamination.

Nuclear Contamination

The two types of nuclear contamination are induced radiation and fallout. Induced radiation is not normally a food service problem as blast or heat will normally destroy material stored in the induction zone. Food may be contaminated by fallout miles away from the blast site. Overhead cover is essential or items may become so heavily contaminated that decontamination becomes difficult or impossible. Food that is packaged in cans or other sealed containers is not in danger of contamination by fallout as long as it remains packaged. Foods not packaged in this way, such as fresh fruits and vegetables and fresh meat, can be protected from fallout by putting them in sealed containers. Insulated food containers and refrigerators are excellent protection from fallout. Containers, such as sea and/or MILVANS, trucks with containerized cargo areas, and trucks with covered cargo beds also offer some protection. If this type of protection is not available, place a canvas tarp or plastic sheet over the items. This will make it easier to decontaminate them.

Biological Contamination

The two types of biological agents are pathogens and toxins. Stringent sanitation in preparing and serving food will reduce contamination by pathogens. Since pathogens may be spread by insects and rodents, insect and rodent control is especially important. Toxins are poisonous substances produced by pathogens and other organisms. To protect food from toxins, store it in sealed, airtight containers. Decontaminate the containers before opening them.

Chemical Contamination

Chemical weapons release toxic chemicals. Food may be protected from chemical contamination by placing it in a sealed, airtight container. Containers must be decontaminated before the food can be consumed. If the unit commander determines that the food must be decontaminated, follow the procedures on page 13-5.

Note: *Chemically contaminated food is difficult to decontaminate. Due to limits in the ability to detect contamination that is bound to other materials, the use of such food will always pose a major risk.*

FOOD INSPECTION

Food or water that may be contaminated by nuclear fallout or biological or chemical agents must be inspected. The Army veterinary services has the sole responsibility for monitoring and recommending food decontamination or disposition procedures and preventive medicine handles water. If food or water becomes contaminated, it must not be consumed unless it is first decontaminated or approved for consumption. Food or water that is free from contamination may be contaminated by equipment or personnel, so they must be inspected as well.

DETECTION METHODS

It is essential that every soldier, especially if he is involved in food service, know how to detect NBC contamination. Methods of inspecting food, water, personnel, and material for signs of NBC contamination are described below.

Nuclear

The radiac meter AN/VDR-2 is used to monitor food, water, personnel, and material for possible contamination by induced radiation or fallout. This instrument, commonly known as a Geiger counter is shown in Figure 13-1, page 13-3. To inspect food, personnel, or material for nuclear contamination, follow the step-by-step directions in the operator's manual. Background radiation will produce a signal even in the absence of contamination. An audible signal (clicks through the headphone) provides the most sensitive indication in changes in the quantity of radiation present. Read the meter to determine the level of radioactivity. Food is contaminated if it produces a

reading greater than two times that of the surrounding environment in an uncontaminated area. These Geiger counters are not sensitive enough to detect unacceptable levels of radioactivity in water. Use water only from an approved source.

Biological

Most Army units have no capability to detect the presence of biological agents in food. The supporting medical unit is responsible for inspecting food for biological agents. Inspect the food for obvious signs of spoilage, such as slime, discoloration, and odor. Keep in mind that contaminated food may look, smell, and taste normal. If food is suspected of being contaminated by biological agents, request a veterinary inspection. Use water from an approved source for preparing food and for drinking. If no water from an approved source is available, disinfect the available water before using it. Water disinfection procedures are described in Chapter 12.

NOTE: *Biological warfare agents intended to attack humans produce no outward changes in food or material.*

WARNING

Disinfection is not effective against all agents. Use water from an unapproved source only when there is no alternative. Food and water may be contaminated by contact with sick food handlers or unsanitary equipment. Inspect food handlers at the beginning of each shift, and inspect food service operations to be sure that proper sanitation is being practiced. See Chapter 12 in this manual for more information on food service sanitation.

Chemical

The first action to take when chemical agents are present is to stop breathing, put on your mask and sound the alarm. Next, evacuate troops in the area. Most chemical agents will change the taste, smell, or appearance of food. Food may become very poisonous without any change in appearance, taste, or smell. *Never taste food to test for chemical agents.* Use the M8A1 automatic chemical agent alarm (Figure 13-2, page 13-4) and the M256 chemical agent detector kit (Figure 13-3, page 13-4) to detect the presence of toxic chemicals; however the M8A1, M256, M8, and M9 papers cannot be used to determine contamination of foodstuffs. The CAM is being fielded as the primary Army Chemical Agent Monitor. Also, the unit should have chemical agent paper (M8 and M9) to detect and identify agents on containers, personnel and equipment. Operating instructions for the chemical agent alarm are in TM 3-6665-225-12. Operating instructions for the chemical agent monitor kit are in TM 3-6665-307-10. Chemical agents in water can be detected with the M272 detector kit. Maximum allowable concentrations are in TB MED 577.

DISPOSAL

Generally, food and water in airtight containers can be consumed after the containers have been decontaminated. Discard unprotected food and water except in extreme emergencies. Decontaminate unprotected food and water only when there is no practical alternative. All disposed contaminated items must be marked and treated as NBC hazard.

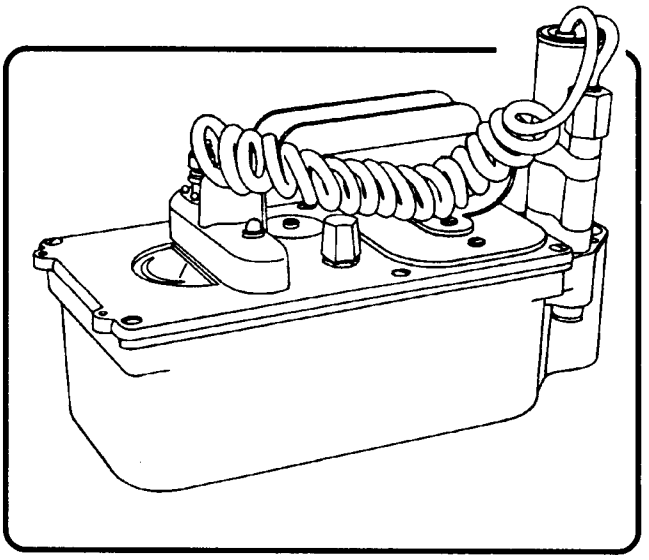

Figure 13-1. Radiac meter

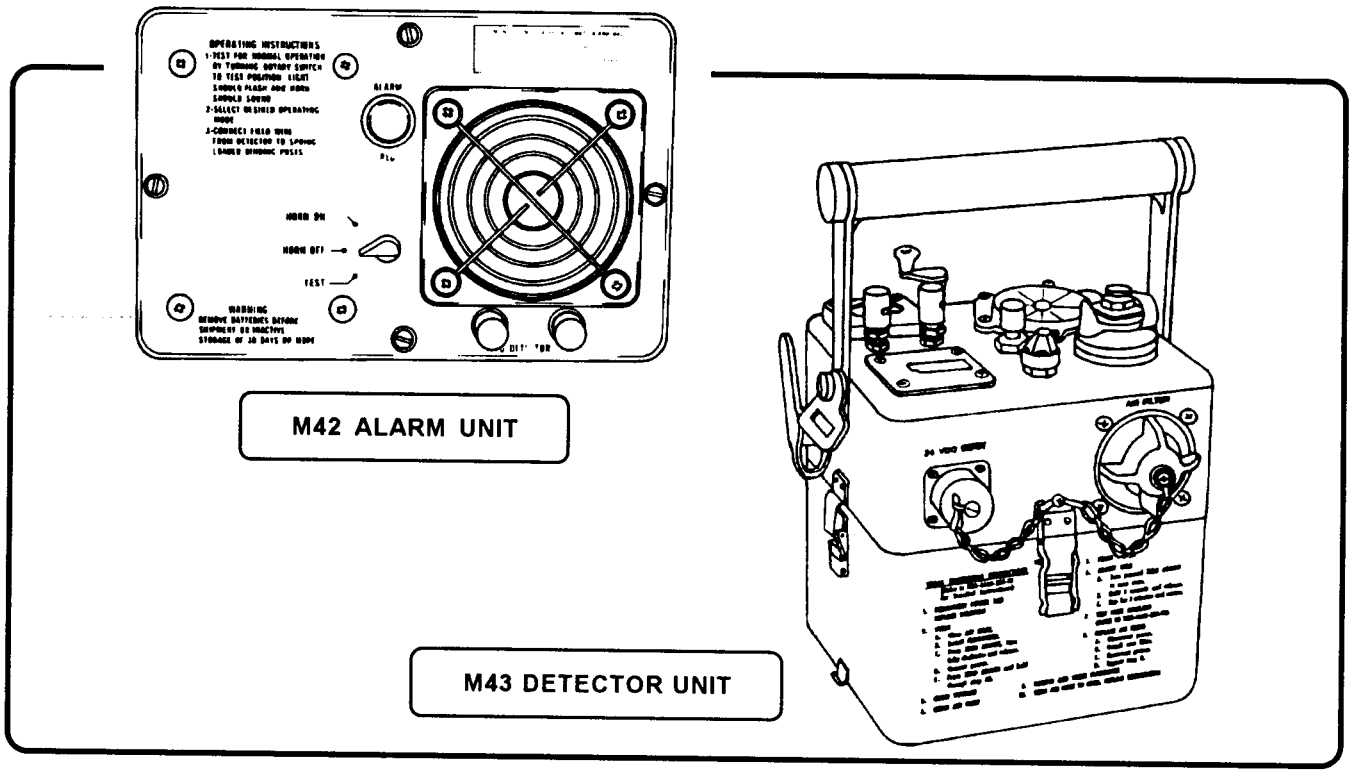

Figure 13-2. M8A1 Automatic chemical agent alarm

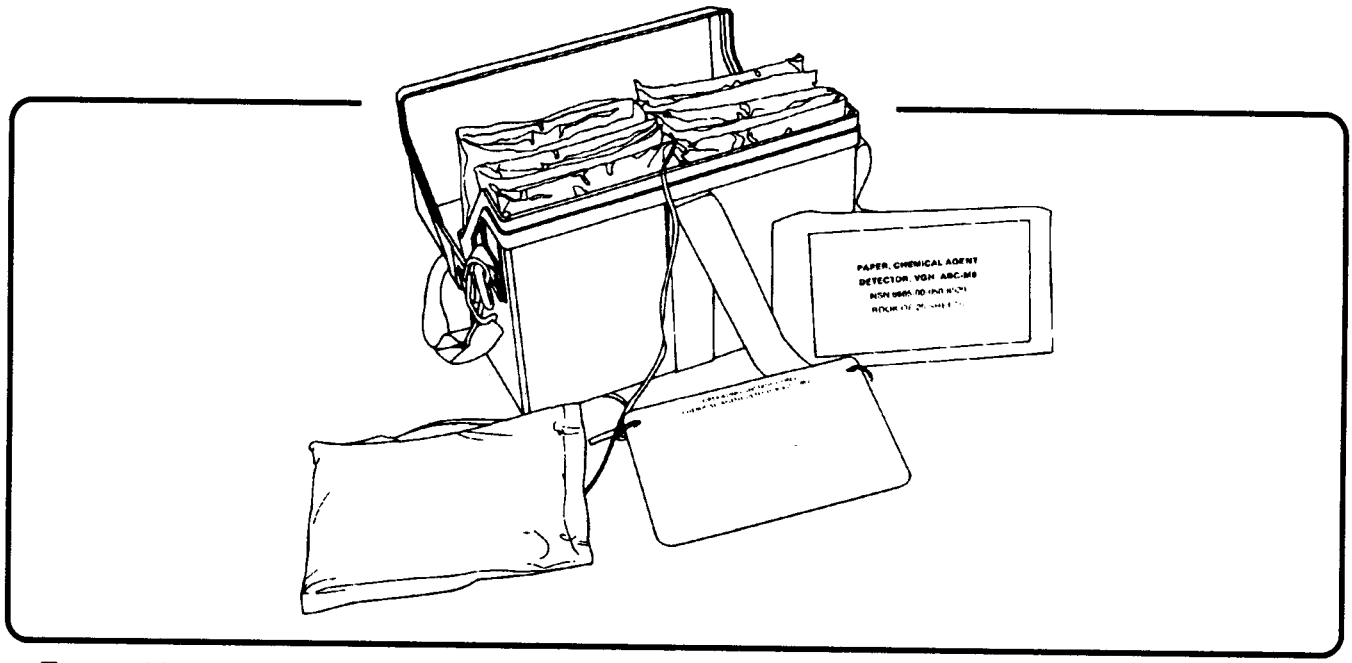

Figure 13-3. M256 chemical agent detector kit with ABC M8 chemical agent detector paper

DECONTAMINATION

Methods of decontaminating subsistence are described below. Dispose of foods that cannot be decontaminated according to local laws or military regulations. If food preparation equipment or food service personnel have been exposed to NBC agents they must be decontaminated. Personnel are decontaminated with the M258-series decontamination kit. Food service equipment should be decontaminated by power driven decontamination equipment or by steam cleaners. A hot water and soapy wash must follow to insure all decontaminates are removed before food products can be prepared.

Nuclear

There are certain procedures to follow when food and water have been contaminated by radioactivity. These procedures are described below.

Food. Except in rare cases of induced radiation, rations in cans or other sealed containers are not in danger of radiological contamination. It will often be impossible to decontaminate meat, fish, etc., due to absorption of the radioactive salts found in fallout.

Normally, the contamination will be limited to the outer surface. Decontaminate by removing the outer packaging or by washing or scrubbing the container under uncontaminated running water. Water runoff from decontamination operations must be captured and treated as a hazard.

Food that is not protected in sealed containers must be suspected of contamination until it is checked. If the unit Commander determines that the food must be decontaminated, move all foods from the contaminated area to a clean area.

Decontaminate potatoes and hard-skinned fruits and vegetables by washing or scrubbing them under uncontaminated running water and then peeling or scraping them and washing them again.

Brush all visible dirt from meat and fish; washing is not recommended. A thin layer may be stripped from the surface of meat or fish. After the outer layer is removed from the food, check it with a radiac set. If the dose-rate reading has become lower, the contamination probably was confined to the surface of the food. Clean the knife and remove a second layer. The cutting away process may be continued, within reason, until the dose-rate reading is near that of the surrounding environment.

Since prepared food in open containers probably will be contaminated, bury or dispose of it as determined by designated medical personnel. Dispose of radiologically contaminated wash water and trimmings the same way.

Food that has been contaminated by induced radiation probably will be made inedible by blast and fire damage. Any foods not destroyed yet contaminated by induced radiation can only be decontaminated by aging. Usually, this requires less than 14 days. Carefully monitoring these foods will determine the progress of radioactive decay during aging.

Water. If you suspect water is contaminated, contact the water supply specialist in charge of the water point being used. Normally, he is in the supporting DS supply company (S&T company in an MSB). He is responsible for quality control for potable water.

Biological

Decontaminate containers contaminated with toxins like those contaminated with chemical agents. Be sure to decontaminate the exposed threads of jars with screw caps before the caps are removed. Do not use water from unapproved sources for drinking or preparing food unless no other water is available. If water from unapproved sources must be used, disinfect it as described in Chapter 12. ***NOTE:*** *Disinfecting water does not ensure that it is safe to drink. If the water is contaminated by toxin, disinfection will not work. Also, some pathogens cannot be destroyed by disinfection.*Food contaminated by pathogens can be made safe by peeling or paring or by heating. VSP can provide guidance.

Peeling and paring. Decontaminate potatoes and hard-skinned fruits that can be peeled or pared. First, disinfect the surface of the food by using disinfectant bleach. After disinfecting the surface, peel or pare,

wash and cook the food thoroughly before serving. In general, most biological agents can be neutralized by thorough cooking.

Heating. Heat is the best way to decontaminate biologically contaminated food. Thorough cooking reduces contamination to a safe level. Decontaminate foods by one of the heat methods in Table 13-1. The type of food and the amount of contamination determines which procedure to use. Make sure that the heat completely penetrates the food for the time shown.

Chemical

Decontaminate food items that have been exposed to chemical agents as shown in Table 13-2. FM 3-5 and FM 8-10-7 provides more detailed guidance. Discard food that is unprotected or poorly protected and that has been exposed to chemical agents unless no other food is available. Foods with a low water content and a high fat content, such as butter, lard, ham, cheese, bacon, fatty meat, and fish, absorb so much mustard and nerve agents that decontamination is impossible. Discard these items. Destroy food exposed to liquid agents (nerve and mustard) or arsenical. In an emergency, you may decontaminate other food that has been exposed to chemical agents as described in Table 13-2. Do not try to decontaminate water that has been exposed to chemical agents. Seek help from your supporting water supply point.

Table 13-1. Heat methods of decontamination

METHOD	DESCRIPTION
Cooking	Cook items in a pressure-type cooker (autoclave) at 15 lbs pressure at 250° F for 15 minutes or cook in a low-pressure cooker at 228° F for one hour.
Baking	Bake items such as bread or related items in a preparatory stage for 40 minutes at 400° F. Bake meat at 325° F for about two hours.
Boiling	Boil certain items for at least 15 minutes as an expedient method when no other method is available.

NOTE: Foods, such as butter and ice cream, will not withstand any of the above treatments, and they must be destroyed. Meats that may be contaminated by biological agents will be cooked until well done.

Table 13-2. Treatment of food tainted with toxic chemicals

AGENT	TYPE OF FOOD	PROCEDURE
Irritant agent	Dry provisions.	Aerate.
*Mustard agent (vapor) or *Nerve agent (vapor)	Food having a high fat content (butter, lard, ham, cheese, bacon, fatty meat, and fish).	DO NOT USE. DISCARD
	Other food.	Trim away fat and grossly contaminated areas. Wash food with water or a solution of 2 percent sodium bicarbonate. Then air for 48 hrs.

**DO NOT attempt to decontaminate food that has been exposed to mustard or nerve agent in a liquid form.*